Research - Gateway Architecture Research

Alpasan, Lois-Kleinner

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Abstract

Academic research informing API-OSS gateway architecture.

Gateway Architecture Research

Overview

Academic research informing API-OSS gateway architecture.

Key Papers

Title	Author	Year	Relevance
"McNettle: High-Performance Gateway"	IBM Research	2018	Event-driven architecture
"SEDA: Staged Event-Driven Architecture"	UC Berkeley	2001	Stage-based design
"Your Server as a Function"	ACM	2013	Functional approach
"Erlang-based Gateway Design"	Ericsson	2015	Fault tolerance patterns

Core Concepts Applied

```yaml
event_driven:
  - Non-blocking I/O
  - Event loop pattern
  - Async task scheduling

staged_processing:
  - Request pipeline stages
  - Backpressure between stages
  - Isolated failure domains

functional:
```

```
  - Immutable request context
  - Pure transformation functions
  - Composable middleware
```

Performance References

```
throughput:
  - C10K problem (Kegel, 1999)
  - C10M problem (2013)
  - Epoll vs kqueue benchmarks

concurrency:
  - Actor model (Hewitt, 1973)
  - Communicating Sequential Processes (Hoare, 1978)
  - Software Transactional Memory
```

Next

- AI Model Routing Research

See Also

Related research, architecture, and whitepaper documentation.

- Research Overview
- Architecture Overview
- Whitepapers
- Performance Research